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Librarianship in Relation to Scientific Research

HUMAN nature being what it is, the continued existence of a collection of books presupposes the existence of a custodian whose primary instinct and duty is defence. So, no doubt, in the fifth or sixth century were the first librarians regarded; and so, of course, have the members of that profession to-day heavy responsibilities for the safety of priceless literary collections.

Not that all books are to be prized as storehouses of the mind; some indeed are "no good for reading", whilst others tell us "little that one need know, very much which it would be a positive mistake to believe". There are old libraries that resemble museums of antiquities, where the shelves are so many substitutes for glass cases; the bindings still a delight to the appreciative eye, and the leaves beckoning us to a near-by arm-chair for the pleasure of a dream in the remoter past. In tune with the atmosphere, we would call the venerable student in whose charge we enjoy these treasures by the name of 'library keeper', feeling the usual designation to be a little too business-like and efficient for our mood. But there are also new libraries which repel or attract us, as may be, with the kaleidoscopic dust-covers of ephemeral fiction purporting to echo the delirium of a feverish modernity; where the keeper of the books cares nothing for their message (perhaps his sense of values is not so false after all) but counts his task well done when he replenishes his stock for fewer pence than his customers are willing to pay for their entertainment. He, too, is a 'librarian', if the title may still be held by a dealer in books, as it once was also by those who copied manuscripts and by their errors planted the seeds of so much perplexity and polemic in later generations. But to-day, if we exclude popular fiction, fewer books are read for pleasure—such is the pace of life and such the competition of other forms of enjoyment—and more for profit, so that our conception of librarianship has undergone a significant change; the custodian of books has come to be recognized for what he really is—a custodian of information. Perhaps the scientific library offers to him at once the most difficult task and the most fruitful opportunity of service in the nation's daily work.

Research, whether it be conceived in an academic spirit or planned to achieve some specific utilitarian purpose, needs for its development a basis of existing knowledge as wide and as deep as can be secured. Study of what is already known is the first step in discovering the unknown; and in that study the research worker needs help in increasing measure as the sources of his information become ever more numerous and heterogeneous. There was a time when the chemist, for example, was both expected and able to read most of the significant original papers in his subject; now he is fortunate if it is possible for him to keep abreast of part of it with the aid both of a voluminous special literature designed expressly for that purpose and of the extensive facilities provided by special libraries.

Yet a collection of books, journals, and pamphlets, while indeed the foundation, is not the only constituent of a scientific library as it is understood to-day. The service which such a library renders to students, investigators, and teachers alike depends for its efficiency on a human factor, the personality and the competence of the library staff; and for that reason, matters relating to their training are of some moment both to research workers and to students, particularly to those

who may be fitted to serve their science better in a library than at a bench. Librarianship has already a valid claim to be ranked as a learned profession, the preparation for which is appropriately a concern of the universities. For example, the School of Librarianship at University College, London, is now in its eighteenth session, having been established by the Senate of the University of London on the basis of suggestions received from the Council of the Library Association, and opened in October, 1919. The School is "organised so as to give a systematic training on a broad basis to students who are already employed in libraries, record offices, or documentation centres, or who propose to adopt work of this kind as their profession."

The full-time course leading to the University of London diploma in librarianship occupies two years in the case of undergraduates (whose matriculation certificate must attest proficiency in Latin), or one year in the case of approved post-graduate students, whilst part-time students are required to devote from three to five years or two years, respectively, to the diploma studies, due account being taken also of practical experience in library administration. So much importance is attached to such experience that the diploma course includes a period of practical work to be carried out in selected libraries, a new arrangement which has already proved its value, and it is a condition of the award of the diploma that a substantial period of service in a library shall have been performed.

The University of London diploma is not, however, the only hall-mark which members of the profession may acquire. Fellowship of the Library Association is already recognized as indicating a very high degree of competence and experience, and the courses provided by the University of London School of Librarianship are equally available to persons desiring to take the intermediate and final examinations conducted by the Library Association. Here, therefore, are two avenues by which aspirants and those who have already commenced the journey may seek to demonstrate that they have reached that degree of competence which, combined with opportunity, will put them in possession, not of fame, but of the knowledge that they contribute significantly in advancing the world's work and culture. Perhaps when fuller recognition is accorded to the position which trained and experienced librarians occupy as 'key' men and women in unlocking the stores of accumulated knowledge for our instruction and delight; when both library authorities and senior members of the profession make greater use of such an institution as the School of Librarianship for the recruitment of their assistants, then an enhanced status will be associated with greater material rewards.

To this end, however, there must needs be co-operation between employers and teachers; and if the truth must be told—as indeed it should—there is here room for considerable improvement. The director of the University of London School of Librarianship, Mr. J. D. Cowley, has recently made a substantial contribution. It is his responsibility to see that his students attain such a degree of familiarity with the principles of librarianship as will equip them to accept service under progressive authorities, and such practice in the application of those principles as will commend them to busy librarians who are thus spared much of the burden of instruction. He has therefore reorganized the syllabus in a manner which experience has led him to regard as desirable, and has devoted special attention to the practical aspects of the work. The new course, which is already in operation, provides lectures and examinations in languages, in English literary history, in cataloguing and classification, in administration (including local government organization and the administration of public, university, and special libraries), in bibliography and in palæography. It includes the period of supervised library experience to which reference has already been made, and makes provision for individual studies or research.

The hope may now be expressed that library authorities will, on their part, make a generous contribution to the further success of this scheme of professional training, helping it to serve more effectively not only the needs of the libraries but also the requirements of the reading public. They can do so, for example, by facilitating participation by junior members of their staffs, by regarding it as a principal source of supply of library officers, and by offering such salaries as will both attract the trained candidate and encourage the University of London to permit the School to expand, both in activities and in numbers, parallel with the demands which the profession of librarianship may make upon it in the interests of a community seeking culture, of a nation demanding progress, and of a world sorely needing that sympathy and understanding which fails where knowledge is lacking.

The Imperial Agricultural Research Institute, New Delhi

By Dr. W. Burns, Imperial Council of Agricultural Research

SINCE the time when Voelcker wrote his report "The Improvement of Indian Agriculture" in 1893, it has been recognized that agricultural progress in India must be based firmly on research. Accordingly, when Mr. Henry Phipps, an American philanthropist, came forward in 1901 with a splendid donation of £30,000 to be devoted to some project of public utility, if possible in the direction of scientific research, Lord Curzon, who was then Viceroy, decided to use the greater part of this donation for the construction of an agricultural research laboratory at Pusa. Pusa is in a rather out-of-the-way part of the province of Bihar, and the choice of site was not perhaps the happiest. The earthquake of January 1934, which did great damage to the Institute, brought up the question of rebuilding or shifting it. The second alternative won the day, and the result is the new Institute of Agricultural Research at New Delhi. But the old name Pusa has become very familiar, and those coiners of local place-names, the taxi and tonga drivers of Delhi, have already christened the new Institute the "Pusa College", while many scientific workers in India often refer to it as the "New Pusa".

The early days of Pusa saw the pioneer work of Leather in soil chemistry, of Butler in the realm of fungal diseases of plants, of the Howards in the production of new races of crops, especially wheat, and of Maxwell-Lefroy (whose name is written in the Book of Martyrs of science) in the cataloguing and combating of insect pests.

The Howards' wheats, particularly Pusa 4, Pusa 12 and Pusa 52, are now grown over six million acres in India, and some of the Pusa wheats have a vogue in Australia. Plant breeding for strictly economic ends and also the study of pure genetics have always figured largely on the programme of the Institute. Some useful hybrids between American and Indian tobaccos, wilt-resistant pigeon-pea strains, and better linseed types are some of the economic results, while the inheritance of characters in several important crops including linseed and chillies (*Capsicum*) has been the subject of important memoirs. It should be mentioned that the now world-famous Sugar Cane Research Station at Coimbatore in the Madras Presidency is a sub-station of the old Pusa and of the new Institute.

The site of the new Institute is within the limits of Imperial Delhi, and contains 476 acres of good agricultural land, plus 300 acres, of which part is pasture and part occupied by roads and buildings. About seventy miles from Delhi on the Grand Trunk Road (and also on the railway) is Karnal, where there is a farm that is now a sub-station of the Imperial Institute. Progress with the construction of the Institute was rapid. Lord Willingdon laid the foundation stone of the library on February 19, 1935. The library and laboratories were, in April 1936, ready for internal fittings and equipment. Work in these laboratories actually began in August 15, and the formal opening took place at the hands of His Excellency the Viceroy, the Marquis of Linlithgow, on November 7, as soon as possible after the Government of India came back to Delhi from Simla. Special references were made on that occasion to the late Sir Fazl-i-Husain (who had as Member for Education, Health and Lands been of the greatest help to the Institute) and the late Dr. F. J. F. Shaw, who was director of the Institute during the period of transfer and reconstruction. The total cost of the transfer, including the building of the new Institute and the acquisition and layout of the land, was Rs. 36 lakhs. The climate and soil of Delhi are suitable for growing a much greater range of crops than at Pusa. Part of the land will be cultivated under rainfall and the rest under irrigation water from the Jumna pumped through 12,000 feet of pipe line and open channels.

The New Delhi Institute naturally differs from that of Pusa in its buildings and layout. The Pusa laboratories were located in a central two-story building, divided up into sections for the various sciences and the library. At Delhi each science has its own separate single-story block, giving ample room for the present and opportunity for expansion in the future. The library is housed in a spacious central building with a clock tower. The Institute now possesses 80,000 volumes and is considered to have the biggest agricultural library in the East. It also receives every important periodical dealing with agriculture and its underlying sciences.

The Botanical Section is housed in two blocks. The main one consists of a number of rooms equipped for advanced scientific work. The outbuildings are situated in an area of 50 acres laid out for plant breeding. New developments of this section are to be in the directions of plant physiology and cytology, while the plant breeding activities of the section will be maintained and intensified.

The Chemical Block, housing activities in soil science and agricultural chemistry, contains forty rooms fitted up for work in general analytical chemistry, micro-analysis, microbiology, soil physics, physical chemistry and plant chemistry. In addition, there are underground rooms where even temperatures can be maintained, laboratory workshops, a pot-culture house and lysimeters. A new feature of the Chemical Block is a laboratory for carrying out small investigations on the utility of agricultural products and to devise ways and means for the making of intermediate products. The need for this was recognized in 1921 by the Board of Agriculture in India.

In the Entomological Block are a main laboratory, a parasite laboratory and underground constant-temperature rooms. The rooms containing the collections have about 10,000 species represented by hundreds of thousands of specimens both pinned and in alcohol.

The Mycological Block has similarly rooms for use as laboratories, as constant-temperature rooms, as culture rooms and as herbaria, the last named containing a very valuable collection of fungi.

There is a group of buildings consisting of a dairy cattle byre with modern fittings, a veterinary dispensary, bull runs, sheds for sick animals and for segregation, and sheds for implements.

No mention of the Institute would be complete without a mention of what is a great attraction to visitors, namely, the famous Pusa pedigree Sahiwal herd. This is one of the finest herds of milch cattle in India. It has been in existence since 1904, when fourteen cows and one bull were purchased from the Punjab. It has gradually been selected from homebred stock with occasional fresh blood from outside. The average milk yield per cow per day has risen from 5 lb. in 1914 to 22 lb. in 1934. The bringing of this herd, numbering 172, from Pusa to Delhi was an achievement in itself, a special train being required, taking four days on the journey. There was no break in the recording of milk yields or of the routine of the herd during the transit, and the animals arrived at Delhi in first-class condition.

In addition to the research work of the Institute, there is also its educational activity. This takes the form of two-year postgraduate courses in which the student specializes in one or other of the subjects botany, chemistry, entomology or mycology, and in which the current research work of the Institute is the background of the teaching. Since the inception of this course in 1923, fifty-six students have passed out from the Institute, of which number forty-six have obtained employment either in provincial or State departments of agriculture or under schemes financed in whole or in part by the Imperial Council of Agricultural Research. There is also given a one-year course in farm management, and as occasion or need arises, short courses in special subjects such as the flue-curing of tobacco are arranged.

Lord Curzon, when laying the foundation stone of the original Pusa Institute, remarked that he would like to visit the place in fifty years time and see what it had grown into. He said, "Should I find Pusa the centre of a great organization, with ramifications extending to all parts of the Indian Continent, training a series of students who will devote their acquired knowledge to the practical pursuit of agriculture and able to point to the tangible results of successful scientific experiment, both in the quality of seeds and plants, in the destruction of pests, and in improvement of breeds of cattle? That is the prospect that I should like to look forward to, and if it be at all realized then we may be assisting at a rather momentous childbirth to-day."

The now twice-born Institute faces the future with the means and the will to carry on to still completer realization this prophetic vision.

Chronological Problems in the Prehistory of North Africa

IMPORTANT questions relating to the antiquity of 'fossil' man in North Africa and to the dating and cultural affinities of the later stone age civilization of North Africa and the Sahara are debated by M. R. Vaufrey, of the Institut de Paléontologie humaine, Paris, in two recently published papers*.

In the first of these, M. Vaufrey has assembled and examined critically the evidence bearing on the age of the skeletal remains and artefacts found in the "escargotières" of Mechta el-Arbi, Tunisia. This midden site was discovered in 1907; but knowledge of its content is imperfect. Owing to the dispersal of the collections both of human remains and artefacts made by M. A. Débruge, to whom the exploration of the site was entrusted in 1913 and again in 1923, only one of the four skulls

* Vaufrey, R., "L'Age des Hommes Fossiles de Mechta el-Arbi". *Bull. Soc. Historique et Géographique de la Région de Sétif* (1935). Vaufrey, R., "L'Âge de l'Art rupestre nord-africain". *Bull. Soc. Préhistorique Française*, **33**, No. 11.

then found is now available, housed in the Institut de Paléontologie humaine. The remaining three, with an additional specimen, are represented by casts. There are also casts of a maxilla and a mandible, while there are two mandibles at Constantine, of which one probably belongs to the Mechta el-Arbi type. The Mechta el-Arbi type has also been recognized in the skeletons from the Ibero-Maurusian cave of Afalou bou Rhummel.

The archæological material obtained from M. Débruge's investigations is also only imperfectly represented in collections, while the material obtained by the archæological mission of the Logan Museum (Beloit, Wis.) in 1926–27, though on a more extended scale, does not include a fully representative series of characteristic microliths owing to defects in the technique of excavation.

Nevertheless, the industry revealed by these investigations—an entirely microlithic industry—is not Capsian; and when the geometric microliths and the microburins, previously overlooked, are added, it conforms with the industries of Aïn Rhilane, Relilaï and a number of other sites of the same culture in the region of Sétif. These all belong to the upper Capsian—the middle Capsian being a purely hypothetical culture, which has never been described anywhere—or to a neolithic with Capsian tradition.

It follows that no greater antiquity than that of this culture can be ascribed to man of Mechta el-Arbi. In other words, Mechta el-Arbi man belongs to the Mesolithic age. Further, it also follows that Capsian man is still unknown. Other skeletal remains, such as those from Djebel Rocknia and Djebel Fartas, and the skeletons secured in 1890 by M. Pallary from caves in the neighbourhood of Oran, do not go back beyond the neolithic of Capsian tradition.

This neolithic of Capsian tradition marks the point when a neolithic culture with pottery, polished axes, querns for corn-grinding, and bifacial arrow-heads, broke in on an upper Capsian culture at the moment when the local industry was on the way to developing the arrow-head with transverse cutting edge. One result of the impact was the magnificent efflorescence of naturalistic rupestral art. This impact came from Egypt across Libya with the time-lag natural in all colonial development.

The age and affiliations of this culture, as found in association with the rupestral art in North Africa, are discussed further by M. Vaufrey in the second of the papers to which reference is made above. It opens with the critical examination of a statement made by M. M. Reygasse, which claimed a relatively high antiquity for certain rock engravings of the Sahara on the evidence of the discovery here for the first time of the spiral with figures of a fauna now extinct, or no longer found locally, such as, for example, the hippopotamus. M. Reygasse had argued further that this evidence showed that the spiral in the Sahara was independent of the Mediterranean, and that in the Hoggar and Tassili des Adjers it was older than the classical spiral of the eastern Mediterranean; while in addition it indicated that these engravings were much more ancient than the paintings showing the Garamantian vehicles.

M. Vaufrey compares the engravings of the Hoggar and Tassilli des Adjers with those from Oued Chreaa in southern Oran, suggesting that these may well be the work of the same artists and belong to the same epoch. He maintains, however, that the extinction of the fauna, which is made the basis of the argument, may not have taken place at so remote a date as stated. It is frequently advanced on the evidence, *inter alia*, of the occurrence of a neolithic industry rich in green stone necklace beads in a cave in the central Sahara, that the desiccation of this region is of relatively recent date; while faunal evidence has been adduced in support of a neolithic pluvial phase in the Sahara extending from the middle of the sixth to the middle of the second millennium B.C.

It has been established by an investigation of a number of stations in Oran, some thirty in all, that the culture associated with the rock engravings is the neolithic with Capsian tradition. By the action of time and weather, this culture is not always represented in its entirety; the pottery, in particular, has usually disappeared. It is, however, better represented in more sheltered conditions, such as are found in the caves of El Arouia, north-north-east of Brézina, where a microlithic industry is associated with a class of pottery, in which the fundamental element is a type with pointed base, richly ornamented with incised decoration and frequently provided with lugs. There is also an abundance of polished axes of various kinds of stone, cylindrical or lenticular in section, as well as querns and mullers for grinding corn. In one of these caves was a naturalistic representation of one of the Equidæ and of a member of the ox family engraved on a stone. This industry was found in the north on the very borders of Oran, and from the evidence of the skeletons found by M. Pallary in 1890, its authors are known to have been of the type of the men of Mechta el-Arbi.

The pointed vases afford a new chronological element. They belong to the type found in the Gerzean culture of Negadeh in Upper Egypt of the predynastic epoch. In the same culture are found the earliest spirals, which appear on the painted ware with rounded base and with lugs,

dating approximately from 4,000 B.C. Among a number of other indications of affiliation is the Libyan sheath, shown on figures at Fedjet el Khaïl and Kharrouba, which links with the Amratians, the predecessors of the Gerzeans, dating from 5,000–4,000 B.C., while an individual at Kharrouba holds a boomerang, which appears also among the Badarians of predynastic Egypt. Finally, the polished axes, the biface arrow-heads, and the harpoons and the fish-hooks of bone, which in North Africa extend as far as Mauretania, also appear in the earliest neolithic civilization of Egypt, the Tasian of the Fayum and Merimde, while the arrow-heads with transverse cutting-edge are found in the Amratian culture.

The neolithic with Capsian tradition of Oran is thus seen to comprise a number of features which derive from Egypt, but are found there as elements in cultures which succeed one another in a period extending from 6,000 to 4,000 B.C. In the Sahara these features appear more or less contemporaneously, as is shown not only by surface finds, but also on stratified sites. Hence the impression left by this neolithic culture of Capsian tradition is that it has been built up on a Capsian foundation by a succession of borrowings from the neolithic cultures of Egypt. It is a colonial culture, and like all such, is affected by a time-lag. Thus, for example, the head of a ruminant surmounted by a disk first appears in Egypt in the Amratian culture. The same figure, accompanied by bovides and ovides, appears in North Africa, but probably dating from the Middle Kingdom. Another example of the same kind is the painted representations of vehicles, which have been attributed variously to the Garamantes and other sources. The simplest explanation is that these paintings are the work of natives who had been in contact with Egypt under the New Empire, but certainly after the introduction of the horse and chariot into Egypt by the Hyksos. This would give a dating for the culture associated with these paintings, or of those representing the horse alone, such as that at Oued Chreaa, of 1,500–1,000 B.C.

While 3,500–4,000 B.C. would thus represent the extreme upward limit of dating for the neolithic culture of Capsian tradition, the gap which exists between this culture and the Mousterian or Aterian in southern Oran and probably throughout the whole of the Sahara, leads to the conclusion that no naturalistic engraving in the whole of this region is older than the neolithico-Capsian culture which is found in association with this North African school of art.

Natural Colour Eclipse Photography

THE first natural colour photograph of a total eclipse of the sun ever reproduced appears in the February issue of the *National Geographic Magazine*. The original photographs were taken on June 19, 1936, at Ak Bulak in Siberia, by Irvine C. Gardner, leader of the National Geographic Society and U.S. National Bureau of Standards Joint Eclipse Expedition.

Dr. Gardner, in his very interesting article describing the general circumstances of the observations, states that six exposures on Dufay colour plates (of 1, 2, 4, 8, 16 and 8 seconds respectively) were made with a specially designed lens of 9 inches aperture and 19-feet focal length. The camera was fixed, being pointed directly at the eclipsed sun, and the plate holder moved to compensate for the solar motion. The solar image had a diameter of almost two inches. One of the photographs is reproduced in colour among the illustrations to the article.

It is perhaps scarcely fair to judge the original photographs by the reproduction, though there is no mention in the text of any differences between the original and the reproduction. The detail shown is, as one would expect, less than in the usual 'black and white' pictures, but all the main structure of the corona is visible, and the image extends to about a solar radius from the limb of the sun. The sky background is reproduced as a brownish-grey, rather than indigo, and the corona itself is distinctly pink, though it is pearly white to bluish to the eye. The prominences show whitish to blue, and this seems to be nearer the truth than the common idea of a vivid scarlet.

The precise object of these photographs is not stated in the article, which is a popular account, but despite these defects as pictures corresponding to direct eye observation, these pioneer attempts at colour photography of eclipses are of enormous interest, for to the astronomers it matters little whether the photograph looks like the original. The important thing is whether there exists a one to one correspondence between the spectral composition of the radiation reaching us from the corona and prominences and the radiation transmitted by the photograph ; or, to be more exact, can the spectral intensity curve of the source be deduced from the spectral absorption curve of the photograph ?

Of course, such 'mosaic' processes as the Dufay colour, and nearly all natural colour processes, do not seek such a correspondence between source and image, but only that the image should closely resemble the source to the eye. As a given hue to the eye may be produced by more than one combination of homogeneous radiation, it does not follow that a colour photograph satisfactory to the eye would be equally satisfactory to the spectroscope, and so far no commercial process satisfies this latter test. But at least a 'mosaic' colour photograph can have the same sort of value that a set of ordinary photographs taken through filters has, and represents a coarse spectro-photometric survey.

Dr. Gardner in his article does not state explicitly whether any steps were taken to make photometric measurements, but by implication something of the sort was contemplated. If it should prove practicable—and these first results of Dr. Gardner's hold high promise—to conduct even rather rough eclipse spectrophotometry in this fashion, then a new technique of great value will be at our disposal. It is too early to express any opinion on the possibilities of this method, but Dr. Gardner is to be congratulated not only on his luck in obtaining clear skies at Ak Bulak, but also on his enterprise and his technical skill in securing these photographs.

Obituary Notices

Dr. W. Maldwyn Davies

BY the sudden and tragic death on February 17 of Dr. W. Maldwyn Davies of Bangor at the age of thirty-four years, entomology, and notably economic entomology, has suffered a grievous loss. Dr. Davies graduated with first-class honours at the University College of North Wales, Bangor, in 1925, and after two years at the Rothamsted Experimental Station he returned to the College in 1927 as adviser in agricultural zoology for North Wales, an appointment which comprised not only duties of a purely advisory character but also to no small extent investigation and research. For this post Davies, with his intimate knowledge of Welsh farmers and Welsh farming, was exceptionally well qualified, as evidenced by his work in connexion with the warble fly, in which science and practice were so happily combined.

Even more outstanding, however, was the research work that Davies was able to carry out in the brief period of ten years. Most notable perhaps was his contribution to our knowledge of the ecology of the aphis *Myzus persicæ* and its relationship to the spread of the virus diseases (mainly leaf-roll) of the potato. Starting from the discovery made by his colleagues, especially Dr. T. Whitehead, that in certain parts of North Wales potatoes could be grown from year to year without the introduction of fresh seed and without appreciable increase in the incidence of virus disease, Davies began a study of the aphis vectors of these diseases. By investigating the population of the aphides in the field, he was able to show that there is a significant difference in the numbers of aphides on farms where healthy seed potatoes could be grown and on those where they could not, a difference which in itself explained the varying incidence of virus disease. At the same time, the important discovery was made that the source of infestation each year was not overwintered eggs on various species of Rosaceæ, but aphides in the apterous stage overwintering on Brassicas, particularly Savoys, and it was concluded that winter Crucifers provide the main source of *M. persicæ* in spring.

The next step was to discover the factors that control the aphis population, and by a combination of laboratory and field work, Davies was able to show that the numbers of aphides in any district depend in part on the proximity of winter host plants but even more on the climatic conditions during the periods of migration. It was found that the aphides are unable to fly when the atmospheric humidity exceeds a certain maximum, owing to the effect of moisture on the wing membranes. It was also found that strong winds, instead of favouring migration, cause the insects to remain *in situ* on the host-plant. The potato-growing areas of North Wales could thus be differentiated on purely meteorological grounds into districts in which the transmission of virus disease would be facilitated by the presence of abundant vectors and those where it would not.

The last stage of the investigation, to establish whether the facts that held good in North Wales were also true of Great Britain as a whole, was already under way, and a visit to Scotland last year was to have been followed this year by a trip to Devon and Cornwall. This conclusion of the work must now be left to others, but Davies's contribution will remain a model of what such an investigation should be, and it is likely to rank as classic in its particular sphere.

Davies was not concerned only with the insects that attack plants, and his work upon the pests of farm animals, notably upon the sheep maggot flies, was of little less importance. At the instance of the Agricultural Research Council, he had recently had the co-operation of a biochemist (Dr. R. P. Hobson) in an investigation of these latter pests—a collaboration that had already produced valuable results and held out great promise of further success.

Davies's official work was thus primarily concerned with agricultural entomology, for which he had a special flair, but his interests nevertheless were not confined to this aspect of his subject. His earliest publications dealt with certain species of Collembola as pests of agricultural crops, and he was so attracted by these insects that he also found time to establish for himself a wide reputation as an authority upon them; many of the collections made by recent expeditions overseas passed through his hands for identification. He had in course of preparation a systematic key to the identification of the British species, which it is hoped is sufficiently advanced to render publication possible.

As a man, Davies was beloved by all who knew him, and he will be greatly missed by entomologists everywhere, and notably by his colleagues and friends in the agricultural services. J. C. F. F.

WE regret to announce the following deaths:

Joseph Auclair, *correspondant* of the Section of Mechanics of the Paris Academy of Sciences.

Prof. Cyrus R. Crosby, professor of entomology in Cornell University, on January 11, aged fifty-eight years.

Prof. J. H. F. Douvillé, formerly professor of palæontology in the National School of Mines, Paris.

Sir Albert Kitson, C.M.G., C.B.E., director of the Geological Survey of the Gold Coast in 1913–30, on March 8, aged sixty-nine years.

Prof. C. J. Lewis, emeritus professor of public health in the University of Birmingham, on February 6.

Prof. F. P. F. Ransom, formerly professor of pharmacology in the University of London, on February 22, aged eighty-seven years.

News and Views

Sir Joseph Barcroft, C.B.E., F.R.S.

SIR JOSEPH BARCROFT retires this year from the chair of physiology in Cambridge to which he succeeded on the death of Langley in 1925. Throughout an active life, Sir Joseph has played a prominent part in maintaining the high tradition of the Cambridge school of physiology. He has made many important contributions to knowledge, and has taught others to do the same, but his greatest contribution to physiology has been through his indirect influence on younger men. His enthusiasm, his good humour, his attractive style of writing and speaking, and his unusual gift for putting the results of profound thought into simple language, have inspired many with a love of physiology which has influenced them throughout their lives. As head of a large laboratory, he has found time to take a friendly interest in many different investigations without actively interfering with the natural development of the ideas of his colleagues.

THOUGH he is not a medical man, much of Sir Joseph's work has been with human subjects, and much of it has had a dramatic quality that has made him widely famous. His early investigations were concerned mainly with the carriage of oxygen by blood, and with the chemical changes in organs such as the salivary glands and the kidneys which were found to use more oxygen during activity than during rest, and to liberate metabolites which controlled their blood supply. In order to study the gases in small samples of blood, or other tissues, he invented a differential manometer which is widely known as the Barcroft apparatus. For many years, he represented Cambridge against Oxford in favour of the view that the passage of gases through the epithelium of the alveoli of the lungs was a simple physical process and that, even under adverse conditions, the lungs could not take up oxygen unless the oxygen pressure in the air was greater than that in the blood. In support of this conclusion he led expeditions up high mountains, and exposed himself to low oxygen pressures for many days in a glass box in Cambridge. In more recent years he has shown, by striking experiments, that the spleen plays an important part in the circulation as a reservoir of blood, which is released in emergencies, and he has added much to our knowledge of the oxygen supply to the fœtus *in utero*, and other allied subjects.

Prof. E. D. Adrian, F.R.S.

PROF. E. D. ADRIAN, who succeeds Sir Joseph Barcroft to the Cambridge chair, has also spent all his scientific life in Cambridge, where he is now a Foulerton research professor of the Royal Society. Before the Great War he worked with Keith Lucas on the problems presented by the impulses in motor nerves. He then left Cambridge, obtained a medical qualification, and quickly showed that he could have been a very successful clinician. He was R.M.O. at the National Hospital, Queen Square, and during the War he had experience of the treatment of shell-shock. In 1919, he returned to Cambridge and started his well-known work on the physical basis of sensation. All knowledge depends on the brain's analysis of impulses arriving in sensory nerves. Adrian took advantage of the new methods for amplifying small electric currents and tapped the messages in the nerves. He has thus analysed the activity of sense organs in a way that was not previously possible. In recognition of this work he received, with Sir Charles Sherrington, a share of the Nobel prize for medicine in 1932. He is now called upon to spread his interests more widely than in the past, and to devote his clear brain and ready understanding to helping investigations in many branches of physiology.

Prof. M. N. Saha, F.R.S.

PROF. MEGHNAD SAHA, who, as is recorded elsewhere in this issue, has been elected president for the current year of the National Institute of Sciences of India, is among the foremost of Indian physicists. He is chiefly known for his theory of stellar spectra, which he put forward in 1920 during a period of research with Prof. A. Fowler at the Imperial College of Science, London. In that theory, which began with a consideration of the solar spectrum and was afterwards extended to the spectra of the stars in general, Saha brought together the thermodynamical theory of ionization of atoms, at that time little known in England, and the observational indications of various degrees of ionization in stellar atmospheres found by Prof. Fowler and others. This formed the starting-point of a vigorous attack on the problems of stellar atmospheres, in which Profs. R. H. Fowler and E. A. Milne in England, and H. N. Russell in America, have taken a prominent part. The result of this work has been not only a partial solution and the establishment of a definite viewpoint for the further examination of stellar atmospheric problems, but also the creation of a closer relationship between laboratory and astronomical physics, for in the light of Saha's theory certain atomic properties, for example, the duration of the excited state of an atom, can be determined from astronomical observation as well as, if not better than, from terrestrial experiments. Prof. Saha has also made other useful contributions to theoretical physics, and is the author of an imposing text-book on the subject.

British Chemical Industry and European Affairs

EUROPEAN affairs in relation to the chemical industry, and particularly to the British chemical industry, recently formed the subject of an address by Dr. H. Levinstein to the Institution of Chemical Engineers. If and when war comes it would, he said, be sudden and overwhelming, whilst industries unprepared for war could not be switched on to the requirements of war without great delay and immense cost. In 1914, war was not expected by the British chemical industry. Dr. Levinstein outlined some of the urgent requirements which the industry then had to face, and referred to some of the great deficiences, delays, and difficulties with which it had to contend. That it eventually surmounted these difficulties and removed these deficiencies is attested by military history, but, said Dr. Levinstein, "I have said enough to show the terrible delay, prolonging suffering and death, inevitable to going to war with our chemical industries as they were in 1914". On the other hand, "the German Government had the nucleus of a strongly centralised and organised industry for the chemical side of the production of munitions of war". The formation of Imperial Chemical Industries, Ltd., and the establishment of the Institution of Chemical Engineers are two developments of importance in the present organization of British chemical industry. "We may be thankful," he said, "for it is of great national importance, that the chemical industry is to-day more closely knit. . . . We are not so unprepared in all matters as may sometimes be thought. At least in the chemical industry we are stronger in every branch; more compact in structure, more complete in scope, with large units ably directed." The chemist has his responsibility, as a citizen, to help in removing the causes of war; but likewise his responsibility for ensuring an adequate defence against aggression is great. Dr. Levinstein has assured us that in Great Britain the chemical industry is not asleep.

Royal Commission for the Exhibition of 1851

IN consequence of the Government's decision in 1935 to forgo any further contributions from the capital resources of the Royal Commission for the Exhibition of 1851 towards the cost of new buildings for the Science Museum, and owing to other factors that have lately tended to stabilize the Commissioners' income for some years to come, the Board of Management of the Commission has been able to set aside sufficient to provide for an additional annual scholarship of two or three years' duration. This will be used to extend to India the scheme of science research scholarships for overseas universities, each of which is of the annual value of £250–£280. To those who have watched the growth of post-graduate studies in India this decision has naturally given great satisfaction, and the allotment of even a single scholarship has been warmly appreciated by the Indian universities. Indian students have, of course, always been eligible for the coveted senior studentships, of which five are awarded each year by the Commissioners to advanced students of science nominated by universities in Great Britain. But until now they have had no chance to participate in the benefits of the overseas scholarships, which have been the means of training in the methods and technique of research and thus equipping for responsible positions in the scientific service of the Empire so much first-rate talent from the universities of Canada, Australia, New Zealand, South Africa and the Irish Free State. Moreover, these awards, of which eight have been made each year, provide a valuable link between research scholars of this country and the Dominions. From this point of view also the inclusion of India in the scheme is of considerable importance.

THE Commissioners' research scholarships scheme, since it was first established in 1891, has, through its beneficiaries, achieved a noteworthy reputation. Of some six hundred past scholars, the majority now occupy positions of the highest rank in almost every branch of scientific activity. University life in Great Britain and the Dominions has been greatly enriched by the men and women trained under the auspices of the Commission. If rather more than half the scholars have distinguished themselves as principals, professors or lecturers in the academic world, the heads of many industrial laboratories and of Government technical establishments at home and abroad have also been recruited from the same source. No less than forty-one scholars have been elected to

fellowship of the Royal Society and four of them have received Nobel prizes. This side of the Commissioners' work—and it is by no means the only side—is perhaps the most notable of their achievements since under the inspiring lead of the Prince Consort they set themselves their first task of developing as a great educational centre the property purchased at South Kensington with the proceeds of the Great Exhibition.

The Institute of Metals

Two important announcements were made by the president of the Institute of Metals, Mr. W. R. Barclay, at the annual general meeting on Wednesday, March 10. The first dealt with co-operation with two sister institutes. As a first step in a scheme of co-operation with the Iron and Steel Institute, members of each Institute can become members of the other without formality other than written application. Combined annual subscriptions and entrance fees have also been arranged. The present scheme of co-operation follows one recently completed by the two Institutes with the American Institute of Mining and Metallurgical Engineers whereby members, associates and student members of the British Institutes may, if under the age of thirty-three years, become junior foreign affiliates of the American Institute of Mining and Metallurgical Engineers on specially favourable terms, the arrangement being reciprocal in the case of members of the American Society. The president also announced that the Council had decided to issue an appeal for the creation of an Endowment Fund, to be invested for the support and extension of the work of the Institute. For the last few years the margin between income and expenditure in the annual accounts had been very narrow, and had afforded little or no opportunity to strengthen the Institute's financial reserves. Economies had been effected wherever possible, but these could not be extended without seriously curtailing the service the Institute renders to its members and to the industry in general. In the judgment of the Council the time had arrived when, on the basis of the record and achievements of the Institute, an appeal could and should be made to the non-ferrous metals industry for a substantial capital sum which it was hoped would appreciably lessen the anxiety constantly felt by the Council and its committees as to the financial future. He was glad to be able to announce that promises or actual contributions amounting to about £14,000 had already been received.

Prehistoric Cultures and Chronology in North Africa

THE most recent contribution of M. R. Vaufrey to discussion of a group of chronological and cultural problems in the archæology of North Africa, of which an account appears in another column of this issue of NATURE (see p. 432), is of more than local interest in its bearing on questions of wide import in the study of prehistoric civilizations. M. Vaufrey, the distinguished anthropologist who occupies a chair in the Institut de Paléontologie humaine in Paris, has explored extensively over a number of years among the prehistoric sites of North Africa, and his studies in the classification of the cultures and in the prehistory of that region are accorded the authority due no less to his meticulous precision as an investigator in the field than to his ability in the analysis of archæological evidence recorded by others. In his latest contributions to a subject upon which no one is thus better qualified than himself to speak, M. Vaufrey has two main objectives.

IN the first place, M. Vaufrey's aim is to determine with such precision as the case warrants the cultural association and dating thereby of the 'fossil' man of Mechta el-Arbi, a problem of no little moment in the history of the development of early types of 'modern' man in the Mediterranean area; and secondly, to determine the age which should be assigned to the characteristic art form of prehistoric North Africa, the rock engravings of varied forms of animal life in naturalistic style, a question long a matter of controversy among archæologists, of which the suggested solutions have ranged from the palæolithic to the Iron age or later. By his conclusions that this type of early man belongs to the Mesolithic age and even later, the early Neolithic, while the cultures with which he is associated, by correlation with the early civilizations of the Nile valley, can be fixed in terms of years at a period extending from the beginning of the fourth millennium, down to the middle or even the end of the second millennium B.C., M. Vaufrey arrives at a result which will be of the first importance when brought into relation with the study of mesolithic and early neolithic cultures throughout the whole range of cultural distributions in the ancient world.

Prehistoric Caves in Kent

A RECENT subsidence of earth at St. Mary Cray, Kent, has revealed the existence of a subterranean cavity, which, it is thought, may prove to be the entrance to a considerable system of caves, similar to that at Chislehurst, two and a half miles away to the south, where thirty miles of galleries have been explored since the caves were rediscovered in 1902. Marks of deer-horn picks, still clearly visible, show where prehistoric man cut away the chalk. Although it will not be possible to attempt to explore the caves at St. Mary Cray until the fallen subsoil has been removed, entrance to two chambers, it is stated in *The Times* of March 4, has been made by Mr. Gibson-Cowan and Mr. Geoffrey Edwards, who found them to be about five feet high by thirty feet long. Probing with a pole ten feet long at the end of the farther chamber failed to encounter obstructing chalk, and it may be concluded, therefore, that they extend in this direction, while the existence of an earlier subsidence a quarter of a mile away, suggests that there may be a system of connected caves of considerable extent. The Chislehurst caves have produced few archæological relics; but as an Elizabethan villa has been shown to have had direct access to the caves by means of a stair, and the caves were used as refuges,

disturbance must have been considerable. At St. Mary Cray, there is no evidence of occupation, at least since Roman times. It is possible, therefore, that they may serve the needs of the archæologist to better effect, and it may be, throw further light on the prehistoric excavators of the chalk, to whose activities the dene holes, notably near Croydon, bear witness. Exploration of the newly discovered caves will begin as soon as the subsided clay has been removed and the roof of one of the chambers has been supplied with the necessary shoring.

Modern Developments in Broadcasting

In a paper read before the Institution of Civil Engineers on February 16, Sir Noel Ashbridge traced briefly the growth of broadcasting transmission and television, and referred to some of the recent developments arising from the researches carried out by the B.B.C. The paper dealt at some length with the design of studios and the effect of size, shape and materials upon their acoustic properties. The advantages of the ribbon microphone over its predecessors were referred to, and the principal methods of sound recording were described. Improvements in the design of transmitting stations are broadly covered by schemes for economizing the power required for producing a given radiation output, and by the use of high vertical aerials, which tend to concentrate the radiation in the horizontal plane so as to give the most efficient service area. Sir Noel remarked on the difficulty of accommodating all the European broadcasting stations within the available wave-length band, and described the expedient of sharing wave-lengths between two or more transmitting stations by synchronizing their carrier waves. Next, a reference was made to the Empire broadcasting service, and the reasons which necessitated the use of short waves for this purpose were outlined. As a result of research carried out on the design of short-wave aerials to give the most efficient radiation, a considerable improvement is to be expected in overseas reception when the new short-wave transmitters of the B.B.C. are brought into operation in the near future. The paper concluded with a brief description of the methods and technique being employed for the transmissions from the London Television Station on ultra-short waves. The results of field strength surveys round London were given, and reference was made to the effect of interference from motor-cars and electrical apparatus.

Ultra-Short Wave Broadcasting

The broadcasting service from the Alexandra Palace television station has already illustrated the suitability of ultra-short waves as a medium for the transmission not only of high-definition pictures but also of speech and music of very high quality. The latter achievement arises from the fact that in the ultra-short wave-band, the permissible band width available for the modulation frequencies is many times that obtainable amidst the present congested conditions in the medium and long-wave broadcasting bands. It is rather natural to suggest, therefore, that more use might be made of the ultra-short wave-lengths for high-fidelity sound broadcasting. This matter was referred to in a note in *The Times* of February 18, in which it was pointed out that this aspect has been under consideration by the B.B.C. for some time past. Indeed, experiments were carried out some years ago with a transmitter installed on the roof of Broadcasting House and operated on a wave-length of six metres. Further experiments are being conducted, but it is stated that no plans have yet been made for the development of a public service on these lines. A large-scale extension of the ultra-short wave broadcasting of sound would be complicated by at least two factors. First is the fact that the B.B.C. is not the only user of the band of wave-lengths below ten metres, for some other national services already have vested interests there. Secondly, there is the difficult problem of interference from the ignition systems of motor-cars, which cause very unpleasant noises in neighbouring receivers working on ultra-short waves. It would seem to be unlikely that broadcasting on these wave-lengths will become really popular until the fitting of suppression devices to such ignition systems is made compulsory.

Radio-Elements as Research Tools

In a lecture to the Society of Chemical Industry on March 1, Prof. F. A. Paneth discussed "Radio-Elements in Chemical and Biological Research". Owing to the extreme sensitivity of electrometric methods it is possible to detect radio-elements in much smaller concentrations than any other chemical substances; and as they are isotopic with ordinary elements we can in many investigations substitute a radio-element for its inactive isotope. Such use of 'radio-elements' as indicators is frequently of great help if the behaviour of an element in very small concentration has to be investigated. Perhaps of even greater importance is a slightly different application. By mixing a fraction of a stable element with its radioactive isotope we can differentiate this fraction from the rest of the element, and then study the exchange of atoms of identical chemical properties. It is especially this use of 'indicated atoms' which opens the door to otherwise insoluble problems. Since the discovery of artificial radio-elements, almost every chemical element can be obtained in the form of its radioactive isotope, and the use of radio-elements as indicators has been greatly extended.

Among the problems to the solution of which radio-elements have contributed are the determination of the solubility of very slightly soluble compounds, the preparation of the volatile hydride of bismuth, the study of the permeability to air of almost completely airtight gas-mask fabrics, of the formation of alloys at low temperatures, the rate of solution of exceedingly thin films, and electro-deposition from extremely dilute solutions. With the help of 'indicated atoms' the diffusion of lead into lead, the determination of the surface of adsorbing crystalline powders, the exchange of atoms of one and the same kind in

chemical reactions have been studied for the first time. The active isotopes of carbon, phosphorus, sodium, calcium and other elements of special importance in biology make it possible to investigate the metabolism of these atoms. The use of radio-elements as indicators is steadily increasing and it is to be expected that in future many chemical, physical and biological laboratories will avail themselves of the great possibilities offered by this method in the study of an infinite variety of problems.

Bird Preservation

THE British Section of the International Committee for Bird Preservation, of which Dr. Percy Lowe is chairman and Mr. D. Seth-Smith treasurer, is appealing for support. It is governed by a committee of sixteen drawn from the Royal Society, the Royal Society of Edinburgh, the Zoological Society of London, the British Ornithologists' Union, the Royal Society for the Protection of Birds, the National Trust, the Society for the Promotion of Nature Reserves and the Society for the Preservation of the Fauna of the Empire. The British Section is not only representative of bird protection interests in Great Britain but, in addition, is in direct communication with similar sections of twenty-six nations. Its work is essentially international in character and deals with problems which can only be solved by scientific and even 'political' work on a very wide front. These include the drafting of a new international convention for the protection of European birds; the destruction of birds by waste oil at sea; the protection of the quail, which is caught in thousands during the breeding season for export to European countries; the conditions under which live birds are transported by sea; and an inquiry into the status of the Anatidæ. This latter, which is regarded as vitally important by scientific workers and sportsmen throughout Europe, includes investigations ranging from the conditions obtaining in northern breeding grounds to the diminution of *Zostera marina*. Of paramount importance is a scheme for ringing duck in order to trace their lines of migration. To carry out this work adequately it is essential that the income of the British Section should be greatly increased. All persons interested are therefore invited to become either patrons at three guineas or associates at 10*s*. 6*d*. a year. Subscriptions should be sent to the Secretary, Miss Phyllis Barclay-Smith, British Section, I.C.B.P., c/o Zoological Society of London, Regent's Park, N.W.8.

Town Planning and Decentralization

THE relationship of man to his work and his environment was explored from various aspects at a conference held by the Garden Cities and Town Planning Association, at the Housing Centre, 13 Suffolk Street, S.W.1, on February 27. Dr. Norman MacFayden, former medical officer of health for Letchworth, showed statistically that the satellite town has proved its great value from the health point of view; his comparative figures for tuberculosis and pneumonia were particularly convincing. He stressed the close relationship between man and Nature which is taken into account in the planning of garden cities, but which the modern congested cities, for example, London, Manchester, Glasgow, cannot provide. The case for the satellite town was further strengthened by papers presented by G. L. Pepler, Colin Clarke and Dr. D. H. Smith. Dr. Smith gave a full account of the uncontrolled location of industries in the Lea Valley on the outskirts of London, and pointed out that in the great majority of cases there was no reason why the factories should not have been located at a greater distance, within satellite towns. He listed a number of problems; noise, traffic congestion, traffic control, vulnerability in war time, journeys to work, as well as health and æsthetic aspects which should be further investigated and could be solved by decentralization. Mr. Colin Clarke estimated the change in the proportion of workers employed in manufacturing industries for 'export' and as compared with local industries and services, and concluded that the increase in the latter, following upon an increased standard of living, will also favour decentralization during the coming decades.

Electricity Supply in Great Britain

ON March 3, in reply to a question by Sir M. Macdonald, Mr. Hore-Belisha, the Minister of Transport, said that his Majesty's Government has decided to adopt in principle the recommendations of the McGowan Committee for a reorganization of electricity supply of the country. A few minor modifications would be added, which he understood would be generally acceptable. In the report it is stated that any attempt to carry through a scheme of reorganization on a voluntary basis would fail, and legislation must confer definite and adequate compulsory powers. It is also stated that schemes of reorganization should make provision for the possibility of ultimate public ownership of all undertakings, including those not at present subject to purchase by the local authorities. Complete standardization of systems and voltages and of methods of charge, as well as amalgamation of a large number of small undertakings into a smaller number of large ones will be necessary. As a result of such reorganization, considerable further development of rural areas should be possible. The scheme recommended by the McGowan Committee should result in a general, though necessarily gradual, reduction in costs. It rejects nationalization as a solution of the distribution problem, at least in the present stage of the evolution of the industry. It prefers to proceed by the gradual method of overhaul and consolidation and a more efficient grouping of existing undertakings. In a report published last December by P E P (Political and Economic Planning, 16 Queen Anne's Gate, S.W.1), the problem is summed up by saying that the public expects that the supply industry will hasten towards a future where the residential consumer, the farmer and the industrialist will have full freedom to use electricity to the greatest advantage. This will obviously take several years.

Nationalism and Use of Land

IN an article on "Nationalism and Land Utilisation in Britain" in the *Geographical Review* of January, Dr. Dudley Stamp directs attention to some of the results of a nationalistic policy in agriculture. Agricultural returns for 1935 and 1936 show an increase in arable acreage and in the total area of improved land, due to protective tariffs, marketing subsidy and, above all, the wheat quota. These schemes lead to excessive specialization in the commodities thus favoured, and they may, by bringing hill slopes under the plough, do more harm than good by the promotion of soil erosion. Again, the general application of, say the wheat quota, throughout the country overlooks the fact that though very little of the country is definitely outside the limits of wheat cultivation, a great part of it is not favourable, and would be harmed by constant soil disturbance. Another important consideration that is overlooked is the very small area of really first-class soils suitable for intensive arable farming such as market gardening, and yet near London and other great towns, where these products are most required, building is allowed to spread regardless of the value of the soil. Furthermore, in the 'reconditioning' of the land, or regrading to a fuller use, it is necessary to supplement the economic standard of judgment, cost per unit, by a standard of nutritional value, and pay more attention to meat and daity products, poultry farming, and fruit and vegetable production.

Experiments in Resuscitation

A REPORT by the Soviet Union Year Book Press Service relates that ten years ago Dr. Sergei Briukhonenko carried out the following experiment. He removed the head of a dog and attached to it an apparatus which he called the autojector for artificial circulation of the blood, with the result that the severed head was kept alive for six months, reacting to all stimuli. Some years later, Dr. Briukhonenko succeeded in resuscitating a whole animal. A dog had its thorax opened and the action of the heart stopped. Death set in, but the animal was revived by the autojector. In 1936 the Institute of Experimental Physiology and Therapy was created to assist Dr. Briukhonenko in his researches. The result has been that not only has resuscitation been effected so long as half an hour after death, but also life has been maintained so that dogs which were put to death in various ways in August and September 1936 and then resuscitated are still alive and in excellent condition.

Lambeth Degrees

AN interesting note on these degrees, by Dr. Cecil Wall, appears in the "Brompton Hospital Reports", vol. 5, 1936. The power to grant such doctorates in any faculty was given to the Archbishop of Canterbury in 1534 through the Act of Supremacy and Succession. A number of degrees in medicine and science, apart from other faculties, have thus been conferred. The Lambeth doctorates were usually conferred for eminent service on those who were unable to conform with the university regulations for internal degrees. Among the men of science who received such degrees on the dates mentioned were Robert Hooke, physicist and secretary of the Royal Society (1691), John Woodward, geologist (1695), and Peter Dent, botanist (1678).

Books on Industrial Management

THE Management Library (23, Bloomsbury Square, W.C.1) has issued a list of forty-seven recommended books on industrial organization and management arranged under such headings as scientific management, finance and accounting, production management, distribution, advertising, commercial and industrial training. The Library contains some further three thousand volumes, and detailed lists, constituting a catalogue, are available free on (1) general management; (2) production; (3) accounting and company secretary; (4) distribution, including retailing; (5) rationalization; (6) psychology; (7) economics; (8) industrial biographies. Short critical reviews are published to keep members up to date as well as an annual cumulative subject-indexed guide to book selection.

Astronomical Society of the Pacific

AT the annual meeting of the Astronomical Society of the Pacific held in San Francisco on January 30, it was announced that the Catherine Wolfe Bruce Gold Medal for 1937 has been awarded to Prof. Ejnar Hartzsprung, director of the University Observatory, Leyden, Holland. In announcing the award, the president of the Society for 1936, Prof. A. O. Leuschner, gave an account of Dr. Hertzsprung's outstanding contributions to astronomy. Announcement has been made by the Director, Dr. W. H. Wright, of provision for an annual appointment to be known as the Alexander F. Morrison Memorial research associateship in the Lick Observatory. Appointments to the research associateship will be made by the regents of the University of California. "The appointee shall be an astronomer, or an authority on some other subject intimately related to astronomy, of wide and admirable repute by virtue of contributions of great value which he has made to the science of astronomy. The holder of the Research Associateship will reside at Mount Hamilton as a guest member of the staff for a certain portion of a year as would be agreed upon." Prof. Hertzsprung has accepted an invitation to be the first visitor under the new foundation.

A New Comet

A COMET of about the seventh magnitude was discovered during the evening of February 27 at the position R.A. $0^h\ 35{\cdot}3^m$: Dec. 19° 22′ N. (at $18^h\ 25{\cdot}1^m$ U.T.). It was first reported to the Central Bureau at Copenhagen by Prof. A. Wilk of the Cracow Observatory, Poland, but apparently the comet was discovered almost simultaneously by observers elsewhere. From observations made since February 27 at Warsaw, Meudon, Copenhagen, in England and elsewhere, two preliminary orbits have been com-

puted, but the one given by Whipple and Cunningham of the Harvard College Observatory appears to fit the observations the better. The elements of this orbit give the date of perihelion as 1937 Feb. 21·73 U.T. and perihelion distance as 0·620 ($\omega = 32° 9'$: $\Omega = 57° 3'$: $i = 25° 57'$). Thus during the present week the comet is receding from the sun, but its distance from the earth is decreasing. In consequence its brightness has remained nearly stationary, though possibly it may reach a maximum about March 13 or 14; although the comet is not a naked-eye object, it should be within the range of binoculars. On February 27, the comet was near the borders of the constellations of Pisces and Andromeda; since then it has been traversing the latter constellation, being near the bright star β Andromedæ in the evening of March 10; the comet's path, continued through Perseus, will have entered Cassiopeia on March 24. In Great Britain the comet has been photographed two or three times by Mr. G. F. Kellaway of Yeovil, Somerset; a short tail to the nucleus is shown on the photographs. Dr. A. C. D. Crommelin thinks that it is worth while to examine the possibility of identity of the present comet with that of the comets of 1532 and 1661.

Announcements

HONORARY membership of the Royal Asiatic Society has been conferred upon Prof. Jules Bloch, of the University of Paris, Prof. Carl Brockelmann, of the University of Breslau, and Prof. J. Ph. Vogel, of the University of Leyden, in recognition of their eminent services to Oriental research.

THE Royal Society of Edinburgh has awarded the Gunning Victoria Jubilee Prize for the period 1932–36 to Prof. C. G. Darwin, master of Christ's College, Cambridge, formerly Tait professor of natural philosophy in the University of Edinburgh, for his distinguished contributions in mathematical physics; and the Makdougall-Brisbane Prize for the period 1934–36 to Dr. E. M. Anderson, formerly of H.M. Geological Survey (Scotland), for his paper "The Dynamics of the Formation of Cone-sheets, Ring-dykes, and Caldron-subsidences", published in the Society's *Proceedings* within the period of the award.

ACCORDING to *Science and Culture*, at the annual meeting of the National Institute of Sciences of India held at Hyderabad on January 5, the following officers were elected for the current year: *President*, Prof. M. N. Saha; *Vice-Presidents*, Prof. S. S. Bhatnagar and Lieut-Colonel R. N. Chopra; *Foreign Secretary*, Prof. B. Sahni; *Secretaries*, Prof. S. P. Agharkar and Dr. A. M. Heron; *Treasurer*, Dr. S. L. Hora.

AT the annual general meeting of the Geological Society of London held on February 19, the following officers were elected for 1937–38: *President*, Prof. O. T. Jones; *Vice-presidents*, Prof. W. T. Gordon, Mr. J. F. N. Green, Prof. W. J. Pugh, and Prof. H. H. Swinnerton; *Secretaries*, Dr. L. Hawkes and Prof. W. B. R. King; *Foreign Secretary*, Sir Arthur Smith Woodward; *Treasurer*, Mr. F. N. Ashcroft.

AT the annual general meeting of the Society of Public Analysts and Other Analytical Chemists held on March 5 the following officers were elected for 1937: *President*, G. Roche Lynch; *Vice-Presidents*, A. L. Bacharach, H. E. Cox, B. S. Evans, A. R. Tankard, J. F. Tocher; *Hon. Treasurer*, E. B. Hughes; *Hon. Secretary*, Lewis Eynon.

THE International Commission of Zoological Nomenclature has elected Mr. Francis Fleming to be secretary in succession to Dr. C. W. Stiles, who has resigned on account of ill-health. The Secretary's address is: British Museum (Natural History), Cromwell Road, London, S.W.7.

BEGINNING on April 1, the Victoria and Albert Museum, including the India Museum, and also the Science Museum, South Kensington, are to remain open on Thursdays, Fridays and Saturdays until 8 p.m. At present the Museums close at 6 p.m. The Museums will remain open until 8 o'clock on the Monday bank holidays at Easter, Whitsun and August.

THE University of Lille has accepted the 15,000 francs awarded to Dr. Cloudesley Brereton for his book on France by the Commission du Tourisme, for a prize to be awarded in alternate years for the best essay on the works of M. Izoulet, of the College of France, and on Mr. Branford's work, "Eros and Psyche" (University of London Press).

JEAN CHAZY has been elected a member of the Section of Astronomy of the Paris Academy of Sciences in succession to the late M. Hamy.

PROF. HEINRICH GLOEL, of Wetzlau, has been awarded the Goethe Medal for Art and Science.

PROF. P. RIVET, professor of anthropology in the Museum of Natural History, Paris, has been created a Commander of the Legion of Honour.

PROF. L. VAN ITALLIE, of Leyden, recently delivered an address before the French Society of Clinical Biology, after which he was awarded the Pasteur Medal.

PROF. KARL BEURLEN, professor of geology and palæontology at Kiel, Prof. Albert Dietrich, professor of pathology at Tübingen, and Prof. Hans Seger, director of the Silesian Museum for Art and Antiquities, Breslau, have been elected members of the Imperial Leopold Caroline German Academy at Halle.

THE Rockefeller Foundation has made a grant of 10,000 dollars for the investigation of filterable viruses under the direction of Dr. George P. Berry, professor of bacteriology and associate professor of medicine at the University of Rochester (U.S.A.), and one of 6,400 dollars for the study of the biological effects of heat by Dr. Stafford L. Warren, associate professor of medicine and radiology.